

REMARKS

Claims 1-9 were pending in the present application. By virtue of this response, claims 2 and 7 have been cancelled, the features recited therein having been incorporated into claims 1 and 5, respectively. Accordingly, claims 1, 3-6 and 8-9 are currently under consideration. Amendment and cancellation of certain of the claims is not to be construed as a dedication to the public of any of the subject matter of the claims as previously presented.

Rejections under 35 U.S.C. § 103(a)

The Office has rejected claims 1-9 as allegedly being unpatentable over Ogawa et al. (US Patent 6,455,877) in view of Goetz et al. (US Patent 6,441,393). Applicant respectfully traverses the rejection, particularly in view of the amendment to claims 1 and 5 to include the features previously recited in dependent claims 2 and 7, respectively.

In particular, the Examiner contends that the combination of Ogawa and Goetz yield what is claimed. Applicant respectfully disagrees with the Examiner's assertion that it would be obvious to combine Ogawa and Goetz. In doing so, Applicant does not take a position at this time whether the combination of Ogawa and Goetz yields what is claimed. Rather, Applicant contends that the Examiner's stated motivation for combining Ogawa and Goetz is fundamentally flawed and that, for at least this reason, the Examiner has failed to set forth a proper prima facie case of obviousness.

The Examiner focuses on Goetz's disclosure that Si doping causes the formation of cracks and that providing "oxygen dopant at the interface region contacting the semiconductor stacked-layer structure . . . would alleviate cracking and improve conductivity of the structure." The Examiner then points to Ogawa (not Goetz) for a supposed disclosure that the concentration of oxygen dopant is at least $3 \times 10^{18} \text{ cm}^{-3}$. *Goetz cl 2, line 26 to 27*

The Examiner appears to be mixing the disclosure of Goetz with the disclosure of Ogawa in a way that contradicts the disclosure of either reference. Applicant agrees that Goetz discloses employing an oxygen-containing dopant in at least some manner. The cited portion of Ogawa,

however – at col. 4, line 46 – merely discloses that “The first average n-type impurity concentration is at least $3 \times 10^{18} \text{ cm}^{-3}$.” This “first average n-type impurity concentration” is of a “first portion.” It is not clear that this “first portion” is an “interface region,” as Ogawa discloses that the “semiconductor layers are formed on the *second* portion.” Col. 4, lines 48-49. In any event, Applicant can find no disclosure that this n-type impurity dopant of the “first portion” is oxygen.

Goetz meets the limitation
In fact, even the Examiner implicitly concedes that Ogawa does not disclose the n-type impurity is oxygen. That is, if Ogawa discloses that the n-type impurity is oxygen, why would the Examiner need to rely on Goetz for a disclosure of the dopant being oxygen. Clearly, the Examiner relies on Goetz for a disclosure of the dopant being oxygen because Ogawa does not itself disclose the n-type impurity is oxygen. The Examiner cannot have it both ways.

The Examiner’s contradictory contentions aside, the Examiner has pointed to nothing in either Ogawa, Goetz, or any other reference or knowledge held by one skilled in the art suggesting or motivating one to obtain or otherwise achieve a nitride-based semiconductor light-emitting device such that the resulting concentration of oxygen atoms in an interface region of a silicon doped n-type GaN-based substrate is in the range recited in the claims.

Cl 2
We also point out that claims 1 and 5 have been amended to include the feature that “said GaN-based substrate contains chlorine.” An advantage of the substrate including chlorine is discussed in the specification at, for example, page 6, lines 10-27. For example, when oxygen atoms are introduced, the presence of the chlorine acts to reduce dislocation effects. The GaN-based substrate is so comprised to improve the quality of nitride-based semiconductor layers grown on that substrate. The effect may be even more remarkable with the special GaN-based substrate produced by HVPE. The conductivity of the special substrate may be controlled by including a particular impurity (Si or p-type impurity). Further, oxygen of the prescribed concentration contained in the interface region of the substrate makes the control of the conductivity easier and improves the quality of the layers grown on that special substrate. For

these reasons, too, the subject matter recited in the claims is not obvious over the combination of Goetz and Ogawa.

CONCLUSION

Applicant has, by way of the remarks presented herein addressed all issues that were raised in the outstanding Office Action. Applicant respectfully contends that this Amendment has overcome the rejections and that the pending claims are in condition for allowance. If it is determined that a telephone conversation would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicant(s) petition(s) for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 245402004200.

Respectfully submitted,



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